

Is it real ?

Infinite Geometric Series

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Infinite Geometric Series

For $|r| < 1$,

$$S = \frac{a_1}{1 - r}$$

WHERE:

a_1 = first term

r = common ratio

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Look at the following situation

A person has to go from point A to point B. Whenever it covers half of the total distance left waits for a few minutes. Can he reach point B ?

I am going to give a solution to this situation. Just look at each step.

Solution

Let the total distance between A and B be x and the point at which he stops will be C, D, E...

The distance between A and B is x

Thus the distance between A and C is $x/2$ (As C is the mid point of AB)

And the distance between C and D is $x/4$ (D is mid point of AC)

Similarly, $DE=x/8$ $EF=x/16$. $FG=x/32$

Note that $x/2 + x/4 + x/8 + x/16 + x/32 + x/64 + x/128 + \dots = x$

The sum of first three terms $x/2 + x/4 + x/8$ is $7x/8$

The sum of first four terms $x/2 + x/4 + x/8 + x/16 = 15x/16$

Observation :

On observing we will find that the sum will be in form $[(n-1)x] / n$. Where n is the final half.i.e

$$x/2 + x/4 + x/8 + x/16 + x/32 + x/64 + x/128 + \dots + x/n = x$$

The sum of all terms will be $(n-1)x / n$

Main Flaw

$$x/2 + x/4 + x/8 + x/16 + x/32 + x/64 + x/128 + \dots + x/n = x$$

$$[(n-1)x] / n = x$$

$$(nx-x)/n = x$$

$$nx-x = nx$$

$$-x = nx - nx$$

$$-x = 0$$

$$x = 0$$

It means that total distance is 0

but it is not possible as a person is moving.

Thus there is a flaw and he could not reach the B

Hope You Understands

